Beach, and Broward counties, is a highly prolific water table aquifer in porous limestone. No more than a few hundred feet thick, the aquifer is capable of yielding thousands of gallons per minute to individual wells. Over 300 million gallons per day are withdrawn for public water supply. The aquifer is highly susceptible to contamination from the surface and to salt water intrusion from overpurnping near the coast. In 1977 and 1978 the majority of public supply wells were found to have detectable levels of synthetic organic chemicals.

Within the area of influence around the large wells tapping the Biscayne aquifer, ground water flow velocities range from 1 to 3 feet per day in the outer boundaries of the area and increase to 100 feet per day in the steep gradient area near the wells. The Dade County study concluded that more stringent controls were necessary within the inner zones where contaminants would move rapidly toward the wells.

A multitiered protection system was developed, ranging from total protection within 100 feet of the well to lesser levels of protection between 100 feet and the 10- to 30-day travel time distance and 30- to 210-day travel time distance. The inner zones are based on the die-off of bacteria in soil and the ground water environment. A second consideration was dilution provided by recharge. The 210-day travel time interval is the longest period with no rainfall on record. Thus, protection of the 210-day zone was viewed as protecting all the ground water that could reach the well undiluted by recharge. The 210-day travel time radius is up to 2 miles for a large wellfield.

Key provisions of the original ordinance include the following:

- Prohibition on discharges within a 10-day travel time zone.
- Establishment of different zones based on travel time to public supply well "cones of influence" defined as the 210-day travel time.
- Limitations on sewage loading to septic tanks based on presence of sandy substrata together with travel time to well (ranging from 140 gallons per capita (gpc)/acre within 100 feet of well to 850 gpc/acre within a 210-day zone of influence where indigenous sandy strata are not present).
- Limitations on waste water effluent for residential and nonresidential property served by sanitary sewers (maximum of 1600 gpc/acre within 30-day travel time; 850 gpc/acre between 100 feet and 10-day travel time.
- Prohibition of hazardous materials use, generation, handling, and storage within the zone of influence of wellfields. The prohibition of hazardous materials is enforced through a covenant to be given in favor of the county placing this restriction on a parcel of land. The covenant is required before issuance of a building permit or occupancy permit.

The travel time concept proved to be controversial for several reasons (Yoder et al., 1984). Conservative (nonreactive) chemicals such as nitrate